

TED (15/19) - 4031  
(REVISION-2015/19)

A22-01643

Reg.No.....  
Signature.....

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, APRIL - 2022**

**DC MACHINES**

(Maximum Marks:100)

(Time: 3 Hours)

**PART - A**  
( Maximum marks : 10 )

**Marks**

- I. Answer all the questions in one or two sentences. Each question carries 2 marks.
1. Compare slip ring and split ring.
  2. Define critical field resistance.
  3. State the necessity of equalizing connections.
  4. Explain the factors affecting speed of the DC motor.
  5. State the advantage of Swinburne's test. (5 x 2 = 10)

**PART - B**  
( Maximum Marks: 30 )

- II Answer *any five* questions from the following. Each question carries 6 marks.
1. Derive the emf equation of DC generator.
  2. Compare between wave winding and lap winding.
  3. Explain the condition to build up voltage in shunt type DC generator.
  4. Describe the methods of improving commutation.
  5. Explain the necessity of starter in a DC motor.
  6. State and explain the losses in DC motor.
  7. List out application of DC series motor. (5 x 6 = 30)

- PART - C**  
(Maximum marks: 60 )  
(Answer *one full* question from each unit. Each full question carries 15 marks.)

**UNIT - 1**

- III (a) Explain the working of single loop DC generator with sufficient wave forms. (7)

- (b) An 8 pole DC generator has 500 armature conductors and a useful flux of 0.05 wb per pole. What will be the emf generated if it is lap connected and runs at 1200rpm? What must be the speed at which it is to be driven produce same emf if it is wave wound? (8)

**OR**

- IV (a) List the classification of DC generators according to the excitation. (7)  
(b) Illustrate the construction details of a DC generator. (8)

**UNIT – 2**

- V (a) Illustrate the open circuit characteristics of a DC shunt generator. (7)  
(b) State and explain armature reaction. (8)

**OR**

- VI (a) List out the application of DC generators. (8)  
(b) Illustrate external and internal characteristics of DC series generator. (7)

**UNIT – 3**

- VII (a) Explain the methods of speed control of DC shunt motor. (7)  
(b) A 250 V shunt motor with armature resistance 0.5ohm runs at 600 rpm on full load and takes an armature current of 20A. If resistance of 1 ohm is placed in the armature circuit, find the speed at (i) full load torque (ii) half load torque. (8)

**OR**

- VIII (a) Explain the working principle of DC motor (7)  
(b) Explain the working of 3 point starter with a neat diagram (8)

**UNIT – 4**

- IX (a) Describe the construction and working of permanent magnet DC motor. (7)  
(b) Illustrate the Swinburne's test of DC machine. (8)

**OR**

- X (a) Describe the direct loading method of DC shunt motor. (7)  
(b) Explain the performance characteristics of DC series motor. (8)

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